APPENDIX D

MDC SAMPLING MEMORANDUM

MDC

Environment, Health & Safety Department

Memorandum

To: Sally Nyren

From: Amy Velasquez

Date: September 24, 2009

C: Marc Nettleton

Subject: Summary of Samples Collected & Analytical Results for Nepaug Dam Caulk & Concrete

Brief History of Dam

The upstream face of the dam was resurfaced on three separate occasions (summarized below). Caulk and sections of concrete were replaced during each project.

1959 – Resurfaced from elevation 498.5 ft down to elevation 480.0 ft.

1974 – Resurfaced from the roadway (elevation 498.5) down to elevation 490.0 ft west of the upper gatehouse and down to elevation 487.5 ft east of the upper gatehouse. The construction drawing details do not show any new caulk above elevation 490.0 ft and the 1959 caulk should have been removed during the resurfacing.

1980 – Resurfaced from elevation 490.0 ft down to elevation 479.5 ft west of the upper gatehouse and from elevation 487.5 ft down to 479.5 ft east of the upper gatehouse. Block 13, the gatehouse, and the spillway section of the dam (blocks 1, 2, 3, 4, and 6) were not included in this work.

During safety inspections conducted in early 2008 at the Metropolitan District's (MDC) Nepaug Dam in New Hartford, CT, weather proof sealants (caulk) that potentially contained PCBs were identified. In October 2008, six caulk samples were collected from between masonry blocks (above the water line) on the upstream face of the dam. These samples were believed to be collected from the area resurfaced in 1980, after the Federal ban on the use of PCB-containing materials. The sealant used for this project was Sikaflex-1a, a polyurethane sealant.

Block/Sample Labels

GZA indicated the six caulk samples were collected from joints 9-11, 7-9, 3-5, 6-8, and 8-10 as well as the right corner of the upper gatehouse. In August 2009, the MDC collected additional caulk samples and sampled concrete, foam and tar from one joint. During this visit it was noted that the visible evidence of sampling seen in the joints (caulk with blade marks or cut outs in sharp triangle shapes) did not always match up with the information provided by GZA. There was no visible evidence of a previous caulk sample being taken from joint 7-9 although GZA indicated this joint

was sampled. Visual evidence indicated a previous sample had been collected from joints 5-7, 9-11 and 8-10. Previous sampling of joint 6-8 could not be confirmed because a large quantity of caulk was missing from the joint and no obvious knife marks were seen. The dam was spilling during this visit making it unsafe to inspect the upper gatehouse and joint 3-5 so information regarding those sampling points is currently unavailable. The GZA and MDC sample locations and corresponding analytical results are summarized on the attached drawing.

The MDC returned to Nepaug Dam on September 11, 2009 to verify the masonry block numbers and the corresponding joint samples. Based on the data compiled during this visit and information originally provided by GZA, the MDC believes GZA's joint 9-11 sample was actually collected from joint 11-13 and their 7-9 sample was actually collected from joint 9-11. The right corner of the upper gatehouse has not been inspected since GZA reportedly sampled it so at this point it is unclear whether they collected their sample from that point or joint 5-7. A table summarizing the samples collected from the contraction joints and any changes made to the sample IDs is attached.

PCBs and Caulk

PCBs were detected in the sample GZA collected from between masonry blocks 11 and 13 (originally identified as 9 and 11) at a concentration of 187 parts per million (ppm). A second extraction and analysis was conducted on this sample and a similar concentration of 138 ppm was detected. The MDC returned to the site in August and collected caulk, concrete, foam, and tar from joint 9-11 to determine if the PCBs had leached into the other material. During this visit caulk samples were also collected from joints 7-9, 5-7, 6-8 and 10-12 and analyzed for PCBs. Due to difficulties identifying blocks from the boat the joint 6-8 sample was originally labeled 4-6 and the joint 8-10 sample was originally labeled 10-12. PCBs were detected in the caulk from joint 6-8 at a concentration of 66 ppm. PCBs were not detected in the other caulk, concrete, foam, or tar samples. The lack of a positive result for PCBs in joint 9-11 adds weight to the theory that this was not the joint GZA originally sampled.

During the September 11, 2009 visit, the MDC collected caulk and concrete samples from joint 11-13. Two types of caulk were seen in and along the joint, white on the west side and a dark grey on the east side (see picture attached). A sample was collected from each type of caulk and a sample was collected of the concrete from just below the surface that is in contact with the grey caulk and another sample was collected approximately 1.5" deep into the concrete. Laboratory analysis identified PCBs at 240,000 ppm or 24% in the grey caulk, 150 ppm in the white caulk, 4,200 ppm in the shallow concrete sample, and 43 ppm in the 1.5" deep concrete sample. A water sample was also collected just below the water surface in front of joint 11-13 to determine if PCBs are leaching into the reservoir. PCBs were not detected in the water sample.

The two types of caulk (white/off-white and dark grey) seen in joint 11-13 seem to match up with GZA's observation that the caulk present between blocks 11 and 13 is different in color from the caulk in the other joints. The white/off-white caulk is present in almost all of the joints inspected so far. The caulk seen in joint 6-8 is a light grey color (see attached photo) and PCBs were detected in this sample at 66 ppm. PCBs were detected in the white/off-white caulk from joint 11-13 but that is likely due to leaching from the grey caulk.

Source

The grey caulk appears to be the source of the PCBs as indicated by the 240,000 ppm concentration detected in the grey caulk from joint 11-13. The grey caulk is present in joints connecting blocks

resurfaced in 1980 with blocks that were not resurfaced at that point (see attached drawing). In other words places where older concrete meets newer concrete. The grey caulk may also be present in joints between two blocks of older concrete (joints 3-5, 1-3, 1-2, 2-4 and 4-6) GZA indicated they sampled joint 3-5 and PCBs were not detected in that sample but we cannot be sure the grey caulk is not there until the joint is inspected by the MDC.

Blocks 11, 9, 7, 5, 8, 10 and 12 were resurfaced in 1980 and the caulk in joints between these blocks was removed. There should not be any 1974 caulk remaining between these blocks and therefore no source of PCBs. The only exception is, as stated above, where block 11 and block 8 meet up with blocks 13 and 6, respectively, which were not resurfaced in 1980.

Gatehouse

Caulk samples were not collected from the windows of the upper gatehouse because of concerns over ruining the water tightness of the window. The caulk in the windows is not degraded like the caulk on the dam (see attached photo). The upper gatehouse windows and window perimeters were refurbished in 2004 and are in excellent condition. Paint samples were not collected during the September visit because of access issues.

Miscellaneous Samples

In October 2008 GZA also collected caulk samples from a joint in the bridge deck and the point where the downstream face of block 5 meets the top of the lower gatehouse. PCBs were not detected in these samples.

Next Step

Concrete and water samples still need to be collected from joint 6-8. A concrete sample also needs to be collected from block 11 to determine if PCBs have leached to the west side of the joint. A detailed visual inspection including photos will be conducted on all joints on the upstream face except joints 11-13, 9-11 and 6-8. Additional information is not needed at these locations. Caulk and concrete samples will be collected where grey caulk and old concrete are identified. Caulk samples will also be collected from joints that have not been sampled to date. Concrete samples will be collected using methods described in EPA's *Standard Operating Procedure for Sampling Concrete in the Field*, dated 12/30/97.

A sample of the peeling paint will be collected from inside the upper gatehouse. Paint will be completely removed from an area and a concrete sample will be collected.

Although the concentration of PCBs seen in the 11-13 grey caulk sample (240,000 ppm) is very high the concentration dropped dramatically just 1.5" into the concrete from the joint and the surface of the dam.

Preliminary Plan

Based on the current theory that they grey caulk placed prior to 1980 is the source of the PCBs, the preliminary remedial plan is to remove caulk at joints not included in the 1980 resurfacing work (joints 11-13, 6-8, 4-6, 2-4, 1-2, 1-3, and 3-5) where the caulk may potentially contain PCBs.

Nepaug Dam Caulk Samples

Joint Numbers	GZA Sample Result	MDC 8-21-09 Result	MDC 9-11-09 Result	Color of Caulk	Comments
East Side of Dam					
11-13			**240,000 ppm**	Dark Grey	Evidence white caulk sampled. Sample originally labeled 9-11 by GZA.
	138 ppm		**150 ppm**	White	
9-11	ND	ND		White	GZA sample originally labeled 7-9. Concrete, foam, and tar samples collected by MDC.
7-9		ND		White	No evidence caulk was sampled.
5-7		ND		White	
East GH	ND			NA	Not inspected by MDC.
3-5	ND			NA	East edge of spillway, not inspected by MDC.
1-3				NA	Spillway
1-2				NA	Spillway
West Side of Dam					
2-4				NA	Spillway
4-6				NA	Spillway
6-8	ND	**66 ppm**		Light Grey	West edge of spillway. Sample originally labeled 6-4 by MDC.
8-10	ND			White	
10-12		ND		White	Sample originally labeled 8-10 by MDC.

Note:

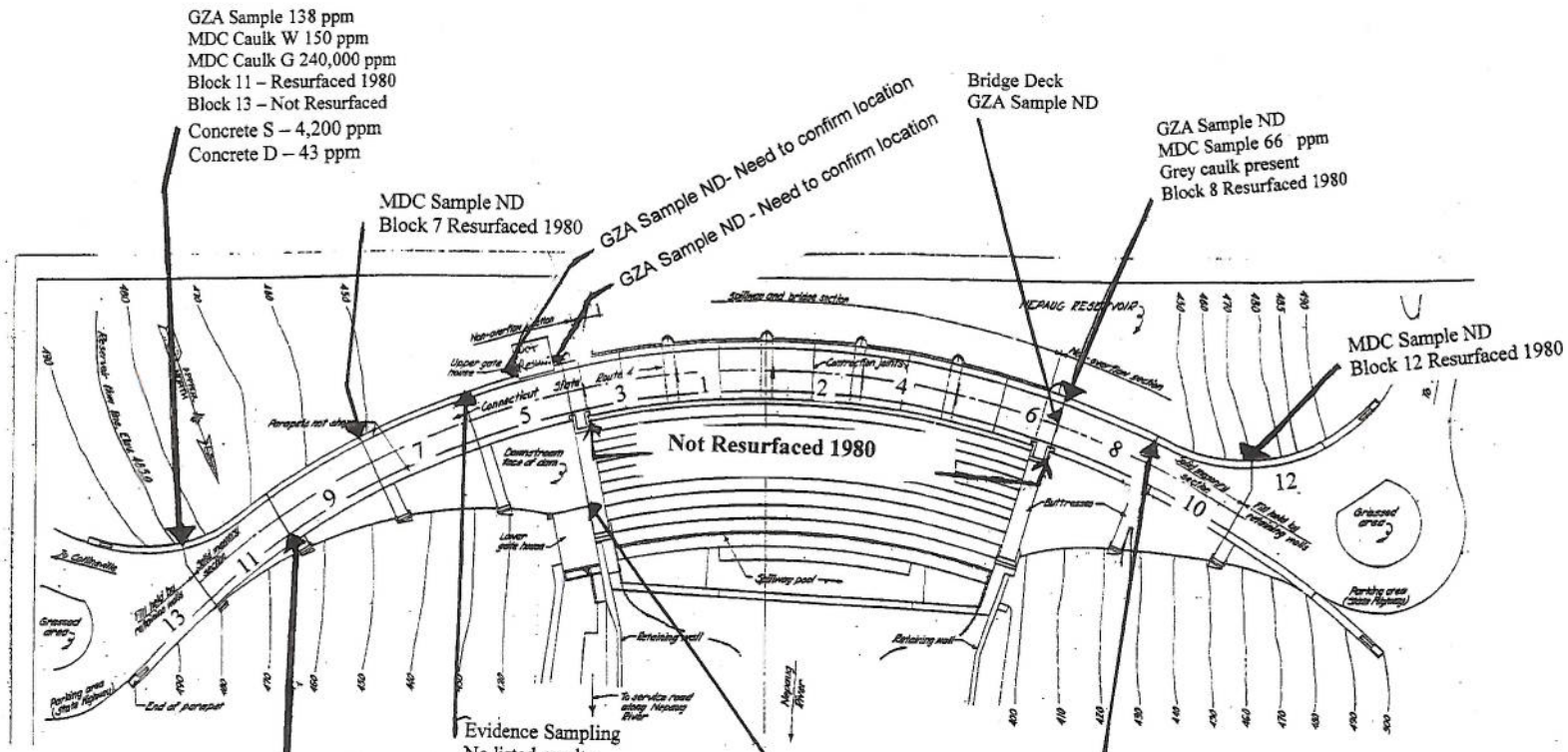
East GH = East side of gatehouse where it meets the dam.

= No sample collected.

Bold = Concentration is above TSCA limit of 50 ppm.

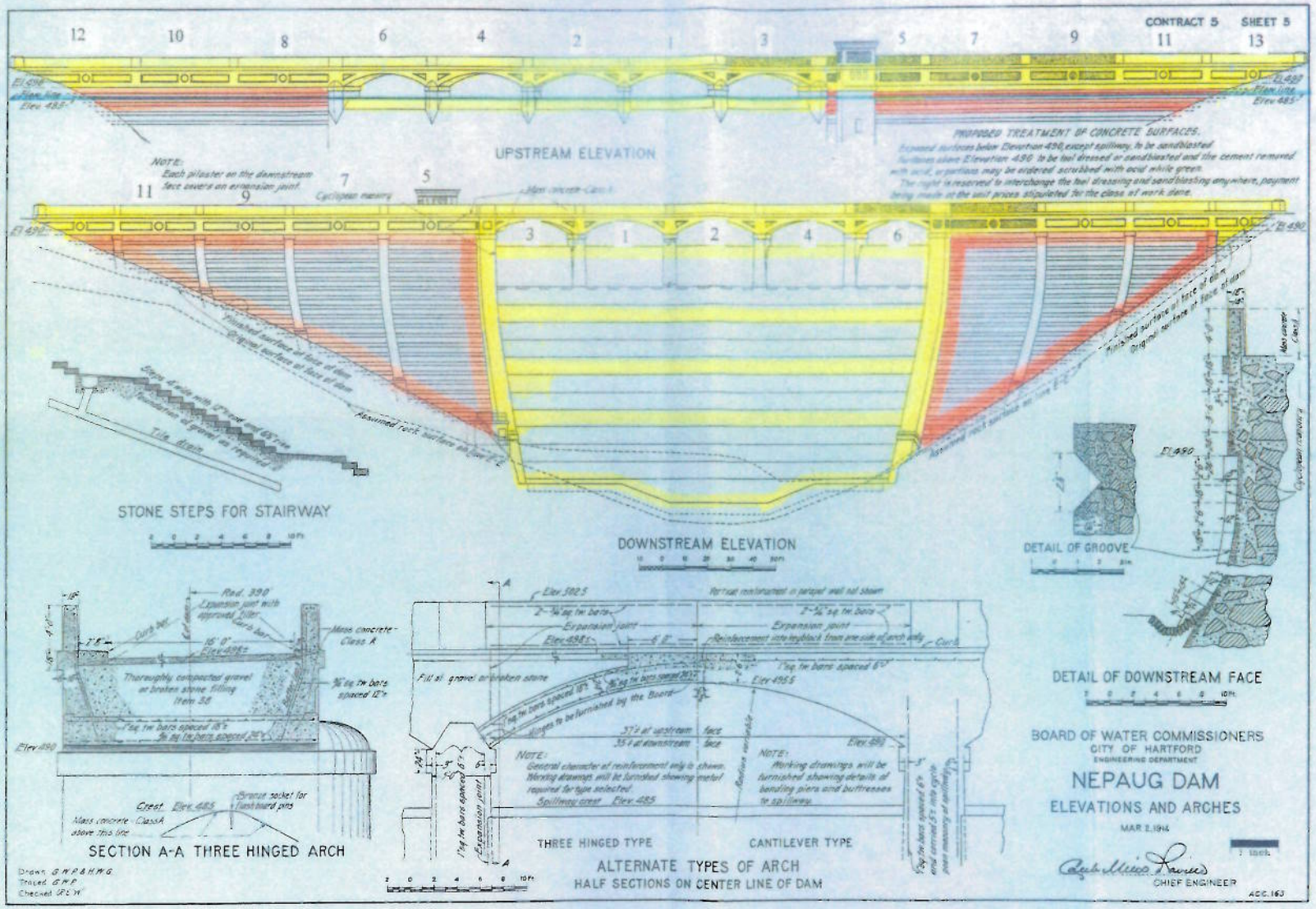
Nepaug Dam Additional Samples

Location	Sample Type	Date	Result	Comments
9-11	Foam	8-21-09	ND	Foam backer behind the caulk.
9-11	Tar	8-21-09	ND	Taken from the east side of the joint below the caulk.
9-11	Concrete	8-21-09	ND	Taken just below the caulk.
11-13	Water	9-11-09	ND	Taken 4 inches below water surface right at the joint.
13	Concrete	9-11-09	4,200 ppm	Older concrete just below the caulk on east side of 11-13 joint.
13	Concrete	9-11-09	43 ppm	Older concrete 1.5" below the caulk on east side of 11-13 joint.



NOTES:
Caulk W = White Caulk
Caulk G = Grey Caulk
Concrete S = Shallow Concrete
Concrete D = Deep Concrete

CONTRACT 5 SHEET 5



BOARD OF WATER COMMISSIONERS
CITY OF HARTFORD
ENGINEERING DEPARTMENT

NEPAUG DAM

ELEVATIONS AND ARCHES

MAR 2 1914

1 inch.

CHIEF ENGINEER

ACC. 163

1974

1980

Metropolitan District Doc ID: MDC 012783